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NAEP State Reports in Mathematics: Valuable Information for Monitoring Education Reform

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The National Assessment of Educational Progress (NAEP), a congressionally mandated program, can provide valuable data to educational policymakers in Massachusetts and other New England states about the status of their educational reform initiatives and their performance standards. The three purposes of this article are to describe NAEP and its goals and structure, to present some of the results of the 1992 Mathematics NAEP Assessment as an example of the utility of this national assessment program, and to highlight ways in which background data collected by NAEP can be helpful in interpreting assessment results and monitoring educational reform. The six New England states aspire to performance standards that approximate national and international standards of excellence. NAEP, which provides an excellent database to influence the standard-setting process, therefore should be of considerable interest to policymakers who are serious about setting meaningful performance standards and monitoring the quality of educational progress.

Major educational reform is under way in Massachusetts, as it is in many other places in the United States. Academic performance standards, curriculum revisions, reorganization of schools, teacher certification and recertification, improved school record keeping, school and district evaluation, and student discipline are all part of the Massachusetts Educational Reform Act of 1993 to improve the quality of K–12 education.

At the center of the educational reform movement in Massachusetts and other states are performance standards. Massachusetts students will be carefully monitored to assess their progress in relation to high educational performance standards in six core subject areas: mathematics, science and technology, history and social science, English, foreign languages, and the arts. According to *MTA Today*, "The law also directs that the standards set high expectations of student performance and take into

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consideration the work and recommendations of national organizations, and be set at a level comparable to those in the most educationally advanced nations of the world."[1] Clearly, the Educational Reform Act of 1993 is demanding high standards of performance for Massachusetts students.

This raises the question of how Massachusetts performance standards will be set. How will it be possible to incorporate national and international perspectives into the standard-setting process? Such perspectives may not be well known to policymakers and educators chosen to set the standards. One problem might be that they set the standards so high, perhaps because of misinformation or poor judgment, as to be unreasonable, thus sending the wrong message to parents, students, policymakers, and educators alike. There is some evidence that this was done on the 1990 initiative to set national performance standards in mathematics.[2]

Unreasonable or inappropriate performance standards are a legitimate concern, as setting them is a judgmental process in which mistakes can easily be made. For example, policymakers in their desire to meet public expectations may set totally unrealistic standards. Lack of familiarity with the curricula, the testing process, or how performance assessments are administered and scored could all affect the process. If the standards are set too low, which is also possible, Massachusetts will achieve its educational goals but *not* meet national and world-class standards. If the standards are set too high in some subjects and grade levels and lower in others, progress across the six major subject areas and grade levels will be difficult to compare, and the results will be extremely difficult if not impossible for policymakers and the like to interpret meaningfully.

What is to be done? How should performance standards be set? One answer may be found in the National Assessment of Educational Progress (NAEP) and the trial state assessment program. Every two years NAEP, the assessment program sponsored by the U.S. Department of Education, produces national and, since 1990, state achievement results that can provide an external frame of reference to assist Massachusetts educational policymakers in interpreting educational progress. Besides being interesting and generally informative to the nation's policymakers and educators, the national results provide a basis for judging content, performance standards, and other aspects of the educational process in Massachusetts. Such comparisons can be valuable in establishing performance standards for Massachusetts students and schools.

In 1992, Massachusetts public schools, 114 at grade 4 and 97 at grade 8, participated in the NAEP Mathematics Assessment. More than 250,000 students nationwide, including 5,000 from Massachusetts, participated in that assessment. How were the performance standards set for interpreting mathematics performance? How did Massachusetts students in grades 4 and 8 perform compared with other northeastern states and the nation? The purposes of this article are threefold: first, NAEP and its goals and structure are described; second, some results of Massachusetts students on the 1992 Mathematics Assessment are highlighted to provide a flavor of the results found in the 204-page report prepared by the Educational Testing Service (ETS) and the National Center for Education Statistics (NCES). Third, a basis for interpreting the Massachusetts assessment results in terms of demographic, school, and nonschool variables is provided through comparisons of mathematics achievement results for various demographic groups in Massachusetts and among curricula, instructional approaches, teacher credentials, and home environments in Massachusetts, the Northeast, and the nation.

All the statistical results reported have been published in the *NAEP Mathematics State Report for Massachusetts,*[3] though their presentation is different and more comprehensive in the NAEP reports. Our aim is to draw attention to the important work of ETS and NCES in the NAEP project and thereby encourage more policymakers in Massachusetts to utilize the NAEP reports. Though this article addresses the Massachusetts mathematics results, reports are available for other New England states in mathematics and several other subject areas, although state comparative results are not always available.

What is NAEP?

Since the late 1960s, the U.S. government, through the National Center for Education Statistics of the Department of Education, has been congressionally mandated to assess American education. The National Assessment of Educational Progress was established to measure the scholastic achievement of our nation's students. NAEP monitors student achievement by periodically testing representative samples of fourth-, eighth-, and twelfth-graders in a number of subject areas, including reading, math, science, social studies, writing, art, computer literacy, and others. In 1990, more than 250,000 students were involved in the assessment of mathematics achievement at the national level. Students in forty-one states also participated at the state level, providing information for their states.

The measurements provide profiles of strengths and weaknesses in students' understanding overall, covering home, school, and classroom contexts for learning. (No individual student scores are available.) Exactly what and how to assess these areas is decided through a consensus process involving many people committed to the improvement of American education. Individuals, from curriculum specialists, teachers, public officials, and business leaders to concerned citizens and parents, are included in this process to assure representation of a broad range of thinking and ideas. Fourteen experts were invited to the first National Assessment meeting in 1969. Today, thousands of people from all over the United States are involved. In the 1994 fiscal year, about $30 million will be spent on NAEP-related activities, including both national and international assessments.

There have been many changes in the reporting of NAEP information since the early years. Until 1984, the primary mode of reporting was at the individual item level. The average performance of various groups — nation, male, female, Hispanic, black, and so forth — on *each* item in the assessment was reported. In 1984, there was a change in score reporting to describe performance of various groups of interest on a score scale somewhat similar to that of the Scholastic Aptitude Test (SAT) except that scores ranged from 0 to 500, as compared with 200 to 800 on the SAT. Thus, because of a reporting scale, it became possible to look at the distribution of performance of various groups of students to indicate how they perform in relation to others. At arbitrarily chosen points along the scale, called anchor levels (i.e., 200, 250, 300, and 350), the knowledge and skills of students were described and then the percentages of students in various groups who obtained that score or better were reported.[4]

Some policymakers were still unhappy with this reporting because it did not address the question of whether the level of student performance was adequate. Such

a view was expressed by the National Assessment Governing Board, the agency responsible for handling NAEP policy issues. In 1988 the National Assessment Governing Board was formed by Congress to decide on "appropriate achievement goals" for each grade and subject area. These "achievement levels" or standards, as they are commonly called, dictate what students *should* know and be able to do at "basic," "proficient," and "advanced" levels of performance, not only what they *do* know (see, for example, the 1994 address to the NCME).[5] Some saw this shift in reporting as controversial because it went beyond merely measuring performance to dictating what skills and information were most important for students to know. At any rate, this is the path NAEP has taken in recent years in an attempt to ensure that American students are obtaining the skills they need to function in a rapidly changing world.

Despite these changes, however, four main objectives have remained intact since the formation of NAEP.

How can an appropriate set of objectives be developed?
What should be the specifications for the construction of new tests?
In what ways should the results of the National Assessment be reported?
How can these results be made meaningful to policymakers?

Clearly, these four goals are all geared toward providing comprehensive and dependable information on the progress of education in the United States. The National Assessment of Educational Progress has recently began to provide this information at the state level. In 1988, a trial state assessment was decided on to enable comparisons of representative samples of students from each participating jurisdiction with one another and with the nation. The first such trial, in which thirty-seven states (Massachusetts was not included) and three territories participated, was conducted in 1990. The second trial state assessment took place in 1992. This provided the states that participated in both assessments with information about their individual educational growth — or lack thereof — in addition to how they compared with other states. Although Massachusetts participated in the 1992 assessment, the state's results were excluded from the analyses, which focused on changes in mathematics achievement between 1990 and 1992.

Until 1988, Congress prohibited the reporting of NAEP results at the student, school, district, and state levels. However, the new 1988 legislation permitted, on a trial basis only, the reporting of results on the 1990, 1992, and 1994 assessments at the state level. In 1990, the focus was on eighth- grade mathematics. In 1992, focus was on fourth- and eighth-grade mathematics, and fourth-grade reading. Recent evaluations suggest that policymakers have been quite pleased with the availability of state-level data. The performance standards have received mixed reviews.

State-level data will provide policymakers and the public with more tangible results. The conclusions are not meant to create a "horse race" between the states. It is hoped that the information will be used to learn from the example of successful regions in order to improve American education as a whole. After all, it won't be long until our nation's educational system will be judged not only by the standards the National Assessment Governing Board decides on, but on international comparisons as well. Currently, the United States is participating fully in the Third International

Mathematics and Science Study in which fourth-, eighth-, and twelfth-grade students from more than sixty countries will participate, though not necessarily at all three grade levels. The results from this assessment will provide the United States with an international perspective on mathematics and science achievement in 1995 and again in 1999. These results will be "linked" to the NAEP scales so that, in theory, individual states can also look at their progress within an international perspective. Such a perspective is called for in the Massachusetts Educational Reform Act of 1993.

Setting National Performance Standards on NAEP

NAEP reports educational performance on a 500-point scale, with scores ranging from zero to 500. The average score for a combined nationally representative sample of fourth-, eighth-, and twelfth-graders in 1990 was set at 250. For the purposes of reporting scores at each grade level, the National Assessment Governing Board (NAGB) convened a panel of teachers, nonteacher educators, and noneducators to set performance standards, called achievement levels by NAGB, for students in the fourth, eighth, and twelfth grades. Three performance standards were set at each grade level to divide the distribution of achievement scores for the nation and each participating state into four performance categories: below basic, basic, proficient, and advanced. The policy definitions of these achievement categories are as follows:

Basic. This level, below proficient, denotes partial mastery of the knowledge and skills that are fundamental for proficient work at each grade.
Proficient. This central level represents solid academic performance for each grade tested. Students reaching this level have demonstrated competency over challenging subject matter and are well prepared for the next level of schooling.
Advanced. This higher level signifies superior performance beyond proficient mastery at each grade.

The forty-six panelists, twenty-four at grade 4 and twenty-two at grade 8, worked for five days with the policy definitions, a national framework of important mathematics skills, and the item pool itself, to eventually set the following performance standards:

Grade	Level	Percentage Score	NAEP Scaled Score
4	Basic	39	211
	Proficient	65	248
	Advanced	84	280
8	Basic	48	256
	Proficient	71	294
	Advanced	87	331

The details of the standard-setting process, which are probably the most elaborate and carefully developed in the history of performance standards, are described in "NAEP 1992: Mathematics State Report for Massachusetts."[6] In fact, that standard-setting procedure might well become the model for performance standard setting in Massachusetts.

How well did Massachusetts students perform in mathematics, and how well did they perform in comparison with those of the Northeast and the nation?

1992 NAEP Mathematics Results

Table 1 provides the grade 4 and grade 8 results for Massachusetts students along with those for other northeastern states and the nation as a whole. For the purposes of this study, northeastern states include Connecticut, Delaware, the District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia.

Table 1

Fourth-Grade and Eighth-Grade Public School Mathematics Achievement

Achievement Level	Region	Grade 4 Percentage	Grade 8 Percentage
At or above advanced level	Massachusetts	3	3
	Northeast	3	5
	Nation	2	3
At or above proficient level	Massachusetts	24	28
	Northeast	23	25
	Nation	18	23
At or above basic level	Massachusetts	70	68
	Northeast	64	59
	Nation	59	61
Below basic level	Massachusetts	30	32
	Northeast	36	41
	Nation	41	39

One important observation is that Massachusetts students at both grades performed above the level of students in other northeastern states and the nation. For example, 70 percent of Massachusetts grade 4 students performed at a basic or better level compared with 64 percent of grade 4 students in other northeastern states and 59 percent of grade 4 students in the nation. It is encouraging to see these results; however, we must also note that 30 percent of the Massachusetts grade 4 students performed at below basic level. This means, for example, that these students were unable to succeed on at least 39 percent of the grade 4 NAEP mathematics items.

Are these results acceptable? Certainly not, given the goals of the Massachusetts educational reform plan. The situation at grade 8 is slightly worse. Here, 68 percent of Massachusetts students performed at a basic or better level, and correspondingly, 32 percent achieved only a below basic level. Though Massachusetts results were better than those of other northeastern states and the nation, they surely are not good enough when about one in three grade 8 students are unable to attain a basic level in mathematics.

The results at the advanced level are quite interesting. Massachusetts students performed about as well as students in other northeastern states and the nation. But the

Table 2

Profile of Public School Students in Massachusetts, the Northeast Region, and the Nation

Region	Subgroups	Grade 4 Percentage	Grade 8 Percentage
Race/Ethnicity			
Massachusetts	White	79	83
	Black	7	5
	Hispanic	8	8
Northeast	White	71	67
	Black	17	19
	Hispanic	8	10
Nation	White	69	69
	Black	17	16
	Hispanic	10	10
Type of Community			
Massachusetts	Advantaged urban	16	7
	Disadvantaged urban	14	23
	Extreme rural	1	1
	Other	68	69
Northeast	Advantaged urban	20	12
	Disadvantaged urban	16	12
	Extreme rural	4	7
	Other	60	69
Nation	Advantaged urban	9	8
	Disadvantaged urban	10	9
	Extreme rural	13	10
	Other	67	72
Parents' Education			
Massachusetts	Graduated college	46	48
	Some education after high school	7	17
	Graduated high school	11	21
	Did not finish high school	2	7
	I don't know	33	7
Northeast	Graduated college	44	38
	Some education after high school	6	18
	Graduated high school	11	26
	Did not finish high school	4	8
	I don't know	35	10
Nation	Graduated college	40	40
	Some education after high school	7	18
	Graduated high school	13	25
	Did not finish high school	4	8
	I don't know	36	9

disappointing aspect of these results is that only about 3 percent of grade 4 and grade 8 students were identified as advanced in mathematics. Policymakers will need to decide what results are acceptable, but the number will almost certainly exceed 3 percent. What these results show is that Massachusetts is doing about as well as other states in producing advanced-level performance in mathematics but that the

percentage of students achieving this level is low. The task is for policymakers to study the results in Table 1 to determine the sources of the problems, to set goals, and to implement plans for improvement. The next time the mathematics assessment is conducted, evidence of any progress should be available. Many states (37) have already had an opportunity to monitor growth over a two-year period, since they participated in the 1990 NAEP Mathematics Assessment. In fact, in 1992, most states showed improvement over their students' 1990 performance, and students nationwide showed useful gains at both grades 4 and 8.

Table 2 contains demographic information about Massachusetts students in grades 4 and 8 compared with students in the Northeast and the nation. The data are organized by race/ethnicity, type of community, and parents' education. Such information can be helpful in interpreting the achievement results. In race/ethnicity, Massachusetts has a higher number — by about 10 percentage points — of white students than the Northeast or the nation. The Hispanic component is approximately the same. In type of community, Massachusetts students are comparable to the Northeast; both tend to include more students from advantaged urban and disadvantaged urban than the national sample. Massachusetts and Northeast parents tend to have more education than those in the country as a whole. A rather large percentage of data in this category was unaccounted for in grade 4. Children of this age simply may be unaware of their parents' educational backgrounds.

Race/Ethnicity

Table 3 contains comparisons of white, black, and Hispanic students is Massachusetts. (Comparisons are also available for race/ethnic groups in Massachusetts, the Northeast, and the nation, but they are not reported here.) Clearly, there are major differences in performances. One of the most revealing statistics is that in Massachusetts, 74 percent of the grade 4 and 65 percent of the grade 8 black students performing at a below basic level. The results for Hispanic students are somewhat better for grade 4 students (58%) and slightly worse for those in grade 8 (70%). Both groups are well below the mathematics performance of the white students. Monitoring such results over the next couple of assessments will be a valuable way to evaluate educational reform in Massachusetts.

Table 3

Fourth-Grade and Eighth-Grade Public School Mathematics Achievement by Race/Ethnicity

Grade	Race/ Ethnicity	— At or Above — Advanced	Proficient	Basic	Below Basic
4	White	3%	28%	77%	23%
	Black	0%	2%	26%	74%
	Hispanic	1%	9%	42%	58%
8	White	4%	31%	74%	26%
	Black	1%	8%	35%	65%
	Hispanic	0%	5%	30%	70%

Type of Community

What role does community play in the results? Table 4 contains information on this question. The advantaged urban category includes students living in both urban and suburban areas where the majority of their parents had professional or managerial careers. In these groups, only a small percentage of students tested below basic, and one out of 10 achieved the advanced level. The disadvantaged urban category also represents students in urban and suburban areas, but high proportions of their parents were on welfare or not regularly employed. This group has five times more below-basic-level students than the advantaged urban group, and fewer than one of 100 students in the advanced level. Tables like Table 4 show the strong correlations between type of community and mathematics achievement results.

Table 4

Fourth-Grade and Eighth-Grade Public School Mathematics Achievement by Type of Community

Grade	Type of Community	— At or Above — Advanced	Proficient	Basic	Below Basic
4	Advantaged urban	8%	41%	88%	12%
	Disadvantaged urban	1%	6%	36%	64%
	Other	3%	25%	75%	25%
8	Advantaged urban	14%	62%	92%	8%
	Disadvantaged urban	0%	7%	38%	62%
	Other	3%	31%	75%	25%

Parents' Education

The Table 5 results, which address the question of the relationship between parents' education and achievement results, show high positive correlations at both grade 4 and grade 8. The percentage of below-basic-level students is at least three times greater among children whose parents who did not graduate from high school compared with those whose parents graduated from college.

Table 5

Fourth-Grade and Eighth-Grade Public School Mathematics Achievement by Parents' Education

Grade	Parents' Education	— At or Above — Advanced	Proficient	Basic	Below Basic
4	Graduated college	5%	34%	79%	21%
	Some education after high school	3%	27%	77%	23%
	Graduated high school	1%	16%	62%	38%
	Did not finish high school	0%	4%	29%	71%
8	Graduated college	6%	41%	80%	20%
	Some education after high school	1%	24%	72%	28%
	Graduated high school	1%	15%	58%	42%
	Did not finish high school	0%	5%	40%	60%

Further Interpretation of Results

What factors affect mathematics achievement? Such questions cannot be answered conclusively with correlational data such as compiled by NAEP. But factors correlated with mathematics achievement can be valuable and point to possible explanations. NAEP routinely collects questionnaire data along with test results. These questionnaires address such information as what students are actually taught in mathematics — covering curriculum, mathematics homework, and instructional emphasis; how mathematics instruction is delivered — includes resources in the classroom, amount of small group work, using mathematical objects, mathematics material; the emphasis on calculators and computers; who is teaching fourth- and eighth-grade mathematics — includes teachers' educational backgrounds; and conditions beyond school that facilitate mathematics learning and teaching. Data highlighting the relationships among these factors and mathematics achievement results are reported for Massachusetts, the Northeast, and the nation in *NAEP Mathematics State Report for Massachusetts.*[7]

Content Emphasis

Table 6 permits the comparison of Massachusetts emphasis on eighth-grade mathematics curriculum with that of the Northeast and of the nation. Probably the most striking information is that Massachusetts teachers emphasize measurement and geometry less than teachers in other states do (see the Low Emphasis column). For example, 25 percent of Massachusetts teachers indicated that they gave low emphasis to geometry, whereas the figure was 10 percent in other northeastern states and 11 percent in the nation. Table 6 provides comparative information on curriculum emphases as well as average proficiency scores.

Table 6

Teachers' Reports on the Emphasis Given to Specific Grade 8 Mathematics Content Areas

Content Area	Region	High Emphasis	Average Proficiency	Low Emphasis	Average Proficiency
Numbers and Operations	Massachusetts	77%	274	4%	302
	Northeast	79%	272	4%	***
	Nation	76%	269	4%	283
Measurement	Massachusetts	14%	278	23%	280
	Northeast	22%	263	16%	277
	Nation	16%	255	15%	281
Geometry	Massachusetts	19%	271	25%	263
	Northeast	21%	265	10%	256
	Nation	18%	263	11%	264
Data Analysis, Statistics, and Probability	Massachusetts	8%	280	51%	272
	Northeast	17%	273	27%	266
	Nation	11%	273	30%	268
Algebra and Functions	Massachusetts	47%	286	15%	247
	Northeast	38%	293	22%	241
	Nation	46%	282	13%	241

***Sample size is too small to produce a reliable estimate (fewer than 62 students).

Assignment of Textbook Problems

One of the goals of the educational reform movement is to break away from the conventional use of textbooks for assigning problems to students. Table 7 shows comparative results at grades 4 and 8. At grade 4, Massachusetts teachers are less likely to assign textbook problems than their counterparts around the country, 58 percent of Massachusetts teachers do, compared with 73 percent of teachers in the Northeast and 75 percent in the nation. At the grade 8 level, however, Massachusetts teachers are comparable to teachers across the country. Results like these combined with other information in the NAEP reports pertaining to instructional approaches will be valuable to policymakers in better understanding how Massachusetts teachers handle mathematics instruction.

Table 7

Teachers' Reports on the Frequency of Use of Problems from Textbooks

Grade	Region	Assignment of Problems from Textbooks (almost every day)	Average Proficiency
4	Massachusetts	58% of teachers	225
	Northeast	73% of teachers	220
	Nation	75% of teachers	216
8	Massachusetts	82% of teachers	274
	Northeast	80% of teachers	271
	Nation	82% of teachers	271

Table 8

Teachers' Reports on the Frequency of Calculator Use

Grade	About how often do students use a calculator?	Region	%	Average Proficiency
4	At least weekly	Massachusetts	18	236
		Northeast	22	225
		Nation	18	222
	Never or hardly ever	Massachusetts	48	220
		Northeast	57	218
		Nation	48	213
8	At least weekly	Massachusetts	35	279
		Northeast	55	272
		Nation	56	274
	Never or hardly ever	Massachusetts	46	267
		Northeast	23	260
		Nation	23	263

Calculator Use

The National Council of Teachers of Mathematics (NCTM) standards are quite clear about the relevance of calculators in mathematics instruction. Also, the College Board now allows the use of calculators on the SAT. These two acts should be significant in expanding the uses of calculators in mathematics instruction. Table 8 includes some interesting results on this question. In fourth grade, Massachusetts teachers approach the use of calculators like those of most other states. About 20 percent of the students use calculators at least once a week, and about 50 percent never or hardly ever use a calculator at all. At the eighth grade, the results are quite different, and it appears that Massachusetts is falling behind. Forty-six percent of Massachusetts students never or hardly ever use calculators. In other northeastern states and the nation, the figure is exactly half, or 23 percent.

At least with respect to NCTM standards, Massachusetts is out of step. It is worth mentioning, however, that despite this lower use of calculators, Massachusetts students' average proficiency scores remain higher than those of students in the Northeast and in the nation.

In-Service Teacher Training

With all the educational reforms taking place, more emphasis is being placed on teacher qualifications and in-service training. Table 9 suggests that at the grade 4 level, the amount of in-service training for Massachusetts teachers is comparable to that of other northeastern states and the nation. However, at the grade 8 level, Massachusetts teachers are receiving rather less training. For example, 47 percent of teachers across the nation are receiving 16 or more hours of in-service education per year, compared with 26 percent of Massachusetts teachers. It may be that Massachusetts teachers are generally better qualified than their counterparts, but this statistic should be of some interest to Massachusetts policymakers and educators. An explanation is in order.

Table 9

Teachers' Reports on Their In-Service Training[1]

Hours	Region	Grade 4 Percentage	Grade 8 Percentage
0	Massachusetts	18	16
	Northeast	18	11
	Nation	17	8
1 to 15	Massachusetts	61	56
	Northeast	68	51
	Nation	62	45
16 or more	Massachusetts	21	26
	Northeast	14	38
	Nation	21	47

[1]During the last year, how much time in total have you spent on in-service education in mathematics or the teaching of mathematics?

School Absenteeism

A self-report form completed by students provided information on the relevance of many home factors on school achievement. Among the variables reported in the

NAEP studies are amount of reading materials in the home, hours of television watched per day, student perceptions of mathematics, and student absenteeism. Table 10 provides results on the last area. Clearly, school attendance is strongly related to mathematics proficiency. Perhaps this is why student attendance is a focus in school reform. These figures can be used to buttress policymakers' study of school attendance and their efforts to improve the situation.

Table 10

Eighth-Grade Students' Reports on the Number of Days of School Missed per Month and Average Proficiency

Days Missed/ Month	Region	Percentage of Students	Average Proficiency
None	Massachusetts	42	279
	Northeast	38	271
	Nation	42	271
One or Two Days	Massachusetts	35	273
	Northeast	35	269
	Nation	34	268
Three or More Days	Massachusetts	23	259
	Northeast	27	260
	Nation	23	257

Programs such as the National Assessment of Education Programs have the potential for providing Massachusetts policymakers with valuable data for judging educational achievement. The national standards were set high with the intention of equaling world-class criteria.

NAEP assessments are also consistent with the content framework developed by national mathematics educators and with the National Council of Teachers of Mathematics standards, which were developed several years ago and are being used countrywide to reshape mathematics instruction in kindergarten through grade 12. As such then, the NAEP results reported by the National Center for Education Statistics[8] provide a meaningful framework for judging mathematics achievement over time.

Massachusetts performance standards may also be judged. If state results suggest that more progress is being made than is suggested by NAEP results, it may be that our curriculum and performance standards are not in step, that is, are too low, and need to be revised. Of course, if state results suggest lower performance than is suggested by NAEP results, then the state standards — content and performance — may simply be too high. NAEP results are only part of the story for judging educational progress in Massachusetts, but they can be quite important. To date, they would appear to have been underutilized by Massachusetts policymakers and educators. ❧

Notes

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4. A. E. Beaton and N. L. Allen, "Interpreting Scales Through Scale Anchoring," *Journal of Educational Statistics* 17, no. 2 (1992): 191–204.
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7. National Center for Education Statistics, *NAEP Mathematics State Report.*
8. Ibid.